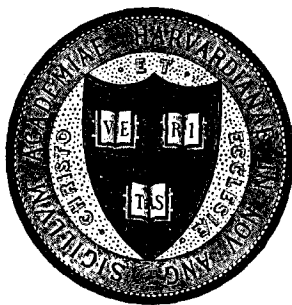


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# FOSSIL COLEOPTERA FROM THE ROCKY MOUNTAIN TERTIARIES.

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In this paper are made known the first fossil Coleoptera from the Tertiaries of the United States; indeed, if we except some doubtful remains found in the red sandstone of the Connecticut Valley, the first distinctively American Coleoptera from any formation. Two beetles have been figured by Heer from the Miocene of Northern Greenland, and these are all that have yet been described from the New World. The preliminary descriptions here presented\* are published in the hope of drawing attention to the rich deposits of the West, which will doubtless prove as fertile as those of Europe. Most of the species have already been drawn for plates which I hope soon to publish in a general work on the fossil insects of the American Tertiaries, to accomplish which the assistance of those who may be able to make collections in the Rocky Mountain region is earnestly solicited.

In the determination of the generic affinities of these insects I have been greatly assisted by the kind advice of my esteemed friend Dr. J. L. LeConte, although he is in no way to be held responsible for any errors I may have committed in studying a group of insects less familiar to me than are others. I am also indebted to Mr. E. P. Austin for the use of his rich collection of American Coleoptera and for assistance in other ways.

Descriptions of the other groups of insects will follow from time to time.

*Bembidium exoletum*.—A single, rather well-preserved specimen, exhibiting the upper surface and impressions of parts of the legs, was found by Prof. W. Denton (the first discoverer of Tertiary insects in America) in the Green River group, near White River, in one of the two localities called by him Chagrin Valley and Fossil Cañon. It is about the size of *Bemb. inaequale* (Say). The head is too poorly preserved to present any characters; the pronotum is of equal width anteriorly and posteriorly, its sides regularly and considerably convex, the posterior angles well defined, the hind margin slightly convex; its surface appears to be very faintly punctulate, at least posteriorly, and there is a slightly impressed median line. The elytra are shaped as in *B. inaequale* and are provided with seven or eight very delicately impressed longitudinal striae, made up apparently of a series of adjacent punctures; the sutural edge is delicately marginate. The fragments of legs show simply that they are of the form usual in *Bembidium*.

Length of insect 4.75<sup>mm</sup>, of pronotum .88<sup>mm</sup>; width of same in the middle 1.2<sup>mm</sup>; of same at the posterior border 1<sup>mm</sup>; of the body at the

\*For previous general accounts of the collections of Professor Denton and Mr. Richardson, upon which the following descriptions are principally based, see: Proc. Bost. Soc. Nat. Hist., x, 305, 6; xi, 117-8. Amer. Nat., i, 56; vi, 665-8. Geol. Mag., v, 220-2 Hollister, Mines of Colorado, 378-87.

humeral portion of the elytra 1.6<sup>mm</sup>; of same at the middle of the elytra 2.06<sup>mm</sup>; length of the elytra 2.8<sup>mm</sup>, of fore femora .96<sup>mm</sup>; breadth of same .24<sup>mm</sup>; length of hind femora (?) .92<sup>mm</sup>; breadth of same .36<sup>mm</sup>; distance apart of the elytral striae .11<sup>mm</sup>.

2. *Laccophilus* sp.—A fragment of a leg found by Professor Denton in Fossil Canon, White River, must be referred to this genus. It represents the hind femur and tibia of a species allied to *L. maculosus* Germ., but is so uncharacteristic a fragment that it is not worthy of further mention.

3. *Philhydrus primavus*.—A single specimen, wanting head, thorax, and legs, but exhibiting at once the upper and under surface of the body, (like specimens mounted after a potash bath,) was found by Mr. F. C. A. Richardson, five miles west of the Green River on the line of the Union Pacific Railroad, in Wyoming. The elytra taper on the apical third, following the narrowing form of the abdomen, and are delicately pointed; they are furnished each with six straight equidistant rows of distinct longitudinal punctate striae, 0.19<sup>mm</sup> distant from one another.

Length of elytra, 3.8<sup>mm</sup>; breadth of same, 1.35<sup>mm</sup>.

4. *Staphylinites obsoletum*.—A single specimen was obtained by Mr. Richardson in the Green River bed at the same locality as the preceding. It is too poorly preserved to determine, until further material is obtained, to what genus of Staphylinidae it should be referred. Following, therefore, the lead of Professor Oswald Heer in similar cases, it is referred to a provisional genus Staphylinites. The head, thorax, and abdomen are of equal breadth; the eyes are round and rather large; the posterior border of the pronotum is well rounded; the elytra are simple, about twice as long as broad, truncate and very broadly rounded, with a large roundish, very dark spot occupying the whole of the tip.

Length of fragment, 3.25<sup>mm</sup>; breadth of same, 1.25<sup>mm</sup>; diameter of eyes, .45<sup>mm</sup>; length of elytra, 1.25<sup>mm</sup>.

5. *Gyrophana saxicola*.—A single specimen of a species allied to *G. vinula* Br. was found by Professor Denton in Chagrin Valley, White River. The head is well rounded, with large round eyes and a rounded labrum. The prothorax is but vaguely defined on the stone, and is apparently of about equal breadth with the head, and shorter than broad. The elytra are of equal length and breadth, each with a pair of longitudinal, straight, delicate raised lines. There is no sculpturing of the surface; no wings can be seen, nor legs, and the indistinctly preserved abdomen is shaped as in *G. vinula*.

Length of body, 1.84<sup>mm</sup>.

6. *Leistotrophus patriarchicus*.—A single greatly-crushed and ill-defined specimen was obtained by Professor Denton at one of the localities explored by him on the White River near its junction with the Green. Above, the head is broader than long, the front very broadly and regularly rounded, the jaws projecting triangularly beyond it; the eyes are large, nearly as long as the head and just as long as the width of the space between them; the whole head is minutely and uniformly granulate. The collar, which is not granulate, is of the same width as the part of the head between the eyes, and about half as long as the head; on one side of, and in direct connection with this are some crushed fragments, apparently of one of the fore coxae and femora, which distort its appearance. The prothorax is of about the size of the head, quadrate, with rounded corners and a slight elevated rim, without punctures or granulations. The elytra are very short, broader than long, quadrate,

squarely docked at the tip, leaving no signs of an exposed scutellum, faintly and distantly punctulate. The outline of the middle coxae is impressed through the remains of the insect, showing them to be shaped as in *Creophilus* and *Leistotrophus*. The abdomen is as broad as the thorax, not much longer than broad, broadly rounded apically, furnished with hairs on the upper surface and apical tufts as in *Creophilus villosus* (Grav.); there are, however, no signs of punctulation.

Length of fragment 12<sup>mm</sup>, of head 2.5<sup>mm</sup>; breadth of same, 3.75<sup>mm</sup>; length of eyes, 2<sup>mm</sup>; breadth of same (as seen from above), .88<sup>mm</sup>; length of tegmina, 1.75<sup>mm</sup>; breadth of same, 2<sup>mm</sup>; breadth of abdomen, 3.8<sup>mm</sup>; length of middle femora, 2.3<sup>mm</sup>; breadth of same, .65<sup>mm</sup>; length of middle coxae, 2.5<sup>mm</sup>; breadth of same, 1.1<sup>mm</sup>; length of hind femora, 2<sup>mm</sup>; of hind tibiae, 2.5<sup>mm</sup>.

7. *Lathrobium abscessum*.—Two fragmentary specimens were taken by Mr. Richardson five miles west of Green River Crossing, Wyoming. The head is smooth, subquadrate, broader than long, with slightly convex sides and hind border, the eyes of medium size, obovate, a little in advance of the middle of the head. The prothorax is smooth, as broad as the head, shaped quite as in *L. elongatum* (Linn.), the sides straight, the anterior angles rounded off, the whole posterior border well rounded. The abdomen is also as in the species mentioned, with rounded tapering tip, but the elytra are shorter, being barely as long as the prothorax, with rounded apices.

Length of body 6.25<sup>mm</sup>, of head .96<sup>mm</sup>, of eyes .25<sup>mm</sup>; breadth of head 1.02<sup>mm</sup>; length of prothorax 1.16<sup>mm</sup>, of elytra 1.05<sup>mm</sup>; breadth of abdomen 1.2<sup>mm</sup>.

8. *Oxytelus pristinus*.—A single fairly preserved specimen, but of which none of the appendages excepting the elytra are visible, was found in Chagrin Valley, White River, by Professor Denton. Apart from the labral prolongation, which is as in other species of *Oxytelus*, the head is subquadrate, slightly broader than long, the eyes occupying the whole lateral outline and but little convex; the sutural divisions of the under surface show through upon the upper surface (which is exposed to view), obscuring somewhat the parts above. The prothorax is somewhat injured, but was evidently subquadrate, a little broader than the head, nearly a third broader than long, the front border slightly concave, the outer margin a little convex, the posterior angles and posterior border exactly as in *Oxytelus rugosus* (Grav.); the surface is delicately punctulate as in the species named, and there is a very slight, shallow, and broad median longitudinal sulcation, whose walls, however, are not elevated into ridges, as usual in the species of *Oxytelus*. The right elytron is expanded, and is, therefore, in the most favorable position for examination; it is more than half as long again as broad, the humeral angle well rounded off, the outer margin very gently convex, the apex squarely docked but slightly convex; the surface is covered rather profusely and uniformly with shallow circular punctures resembling those of the prothorax, and averaging about .04<sup>mm</sup> in diameter. The abdomen is much as usual in *Oxytelus*, the sides slightly convex and the tip of the abdomen bluntly and rather regularly rounded; it was evidently furnished rather abundantly with very fine, short hairs.

Length of body 4.2<sup>mm</sup>, of head .78<sup>mm</sup>; breadth of same, 8<sup>mm</sup>; length of eyes, .54<sup>mm</sup>; breadth of same, .18<sup>mm</sup>; length of prothorax, .72<sup>mm</sup>; breadth of same, .9<sup>mm</sup>; length of elytra, 1.22<sup>mm</sup>; breadth of same, .75<sup>mm</sup>; breadth of abdomen, 1.16<sup>mm</sup>.

9. *Antherophagus priscus*.—Several specimens, representing either the upper or the under surface of the body, were obtained by Mr. Richard-

son west of the Green River Crossing, Wyoming Territory. They resemble *A. ochraceus* Melsh, in general appearance. The head is nearly as broad as the thorax and well rounded; the eyes are about circular, .11<sup>mm</sup> in diameter; the mandibles are stout, about twice as long as their breadth at base, tapering but slightly; the labium is narrow. The prothorax is about twice as broad as long, smooth, the front border slightly concave above, rather strongly concave below, the sides gently and regularly convex, the anterior angles rectangular, the posterior less prominent, the hind border broadly convex. The prosternum and the other sternal portions of the thorax seem to be delicately granulose; the middle coxæ are about equidistant from the others, or perhaps slightly closer to the hind pair, and the fore coxæ are more closely approximated to each other than the others, being separated by less than their own width. The scutellum is small, scarcely longer than broad. The elytra are smooth, equal, tapering only near the tip, the extremity of each independently and roundly pointed.

Length, 3.2<sup>mm</sup>; breadth, 1.65<sup>mm</sup>; breadth of head, 1.05<sup>mm</sup>; of prothorax, 1.53<sup>mm</sup>; length of same, .75<sup>mm</sup>; of elytra, 2.1<sup>mm</sup>; breadth of same, .9<sup>mm</sup>.

10. *Phenolia incapax*.—Represented only by a single specimen and its reverse from the Green River shales (Richardson), showing the under surface of the body, from which the appendages have been torn. It closely resembles, in size, form, and the relation of the parts, *P. grossa* (Fabr.), but differs from it in the character of the under surface of the body, which, in the fossil species, is very minutely and very faintly punctulate, and the posterior edges of the segments are not raised.

Length of fragment, 5.5<sup>mm</sup>; of abdomen, 2.3<sup>mm</sup>; breadth of same, 3<sup>mm</sup>.

11. *Chrysobothris Haydeni*.—A single specimen, rather poorly preserved and obliquely crushed, was obtained by the United States Geological Survey of the Territories at Castello's Ranch, South Park, Colorado (No. 1722). While it is unquestionably a Buprestid, I place this species in *Chrysobothris* with some hesitancy. The shortness of the broad-tipped elytra, the rotundity of the eyes, and the comparatively slender fore femora separate it from the species of that genus which I have examined. The head is large, full, well rounded; the eyes moderately large, nearly circular; the prothorax is rather short, arched a little, minutely and shallowly punctulate. The elytra reach to the base of the penultimate abdominal segment, and, as exhibited on the stone, are as broad at tip as at base; the apex in any case is broad, broadly rounded or almost docked; there is no appearance of punctures, although there seem to be three or four faint equidistant longitudinal ridges. The legs are slender and the fore femora resemble the others.

Length of insect, 15.75<sup>mm</sup>; of prothorax, 3.75<sup>mm</sup>; of elytra, 10<sup>mm</sup>; width of last at tip, 2.6<sup>mm</sup>; length of fore femora, 3.25<sup>mm</sup>; breadth of same, .56<sup>mm</sup>; length of hind femora, 3.25<sup>mm</sup>; breadth of same, 0.46<sup>mm</sup>.

12. *Epiphanis deletus*.—A single specimen was brought from Fossil Canon, White River, by Professor Denton. On account of the structure of the antennæ and general resemblance of the insect to *Epiphanis cornutus* Eschsch, I have placed it in the same genus; but the form of the prothorax differs somewhat in the two species. The head is moderately large, subquadrate, the antennæ moniliform, composed of twelve (preserved) equal joints. The thorax is nearly quadrate with straight sides, the front lateral angles rectangular, the front border straight or scarcely concave, the hind border slightly angulate; the elytra are slender and taper from the middle backward; they are too poorly preserved to show the markings.

Length, 5<sup>mm</sup>; breadth, 1.52<sup>mm</sup>; length of head, .94<sup>mm</sup>; breadth of same, .96<sup>mm</sup>; length of prothorax, 1.12<sup>mm</sup>; breadth of same, 1.24<sup>mm</sup>; length of elytra, 2.85<sup>mm</sup>; breadth of same, .76<sup>mm</sup>; length of antennæ, 1.6<sup>mm</sup>; of sixth joint of same, .13<sup>mm</sup>.

13. *Corymbites velatus*.—A single specimen, with its reverse, was found by Mr. Richardson west of the Green River crossing, Wyoming. The head and prothorax are gone, but both upper and under surface of the rest of the body, including the elytra, may be seen in each impression with nearly equal distinctness. The insect appears to have been about the size of *C. medianus* (Germ.), but more closely allied in form to *C. splendens* (Ziegl.). The legs have been destroyed, but the middle and hind coxal cavities may be seen. The elytra are of the length of the abdomen, acutely angled, almost pointed at the tip, and furnished near the outer edge with a broad and shallow furrow, whose outer limit is abrupt and thus well marked. Besides this the elytra are faintly and distantly striate, with five or six rows of striæ, and the meso- and meta-sternum are very delicately granulate.

Length of fragment, 6<sup>mm</sup>; breadth, 3<sup>mm</sup>; distance between anterior edges of middle and hind coxæ, 1.75<sup>mm</sup>.

14. *Oxygonus mortuus*.—A single elytron, and its reverse, were obtained by Professor Denton, at Fossil Cañon, White River. It is slender, the humeral angle well rounded, the outer edge apparently a little marginate; it is almost equal until near the tip, when it tapers to a point. This peculiarity leads me to refer it to *Oxygonus*, although the apex is not produced so much as in recent species of that group. It is furnished with eight equidistant, rather strongly-impressed but delicate striæ, that nearest the suture almost incroaching upon the margin; these striæ are equidistant anteriorly and in the middle, but posteriorly they converge toward each other.

Length of elytron, 4.55<sup>mm</sup>; breadth, 1.72<sup>mm</sup>; distance of striæ apart, .2<sup>mm</sup>.

15. *Chauliognathus pristinus*.—A single specimen, with its reverse, was obtained by Mr. T. L. Mead at Castello's ranch, South Park, Colorado. It is very fairly preserved, and presents a dorsal view of the insect, with the left elytron and wing partially expanded. The head is rather small, rounded, the front extending considerably beyond the large eyes. The antennæ are about as long as the elytra, and apparently consist of twelve joints, most or all of which are similar to one another, cylindrical, about three times as long as broad, and scarcely smaller at the basal than at the distal extremity. The prothorax is small, scarcely larger than the head, the anterior border rounded. The elytra are slender, square at the shoulder, each independently rounded and slightly tapering at the apex, not reaching the tip of the abdomen. The abdomen, which tapers posteriorly, appears, however, to be unnaturally produced; more than four segments can be counted beyond the unexpanded elytron. The wings are as long only as the elytra; the legs are slender, but the tarsi are indistinguishable. But for the brevity of the elytra, there would be little doubt that this insect should be referred to *Chauliognathus*. It has the general appearance, also, of a *Malthinus* or a *Malthodes*, but the wings are not exposed when the elytra are closed, and the insect is much larger than the living species of these genera. Heer has described, from Oeningen and Radoboj, several Telephoridæ, but none so large as this, unless it be his *Telephorus Germarii*. Our species has much the general appearance of his figure of *Lytta Æsculapii*, but the structure of the antennæ forbids its reference to that group.

16. *Sitodrepa defuncta*.—A single elytron, with its reverse, was found by Mr. Richardson west of the Green River Crossing, Wyoming. It is very poorly preserved, more than twice and a half as long as broad, equal until near the tip, which is rounded off; it is traversed by eight or nine very slightly impressed and delicate punctate striae, .1mm apart. Length, 2.75mm; breadth, 1.06mm.

17. *Spermophagus vivificatus*.—Two specimens, reverses, but one showing more plainly the upper, the other the under surface, were brought by Mr. T. L. Mead from Castello's ranch, South Park, Colorado. They are in an unusually good state of preservation. But very little of the small head can be seen, either upon the upper or the under surface; the portion exposed is delicately punctured, the punctures being closely crowded, and rather less than one-hundredth of a millimeter in diameter. The antennae show nine joints, which are together longer than the breadth of the prothorax; the first and second joints are ovate, the remainder more or less obconical; the first four are of nearly equal length, and of about the same length and breadth; beyond, the joints are subequal among themselves, but much longer than broad. The prothorax is crushed, and although not misplaced, it is difficult to determine its exact form, or whether or not it wholly concealed the head from above. It is more coarsely punctate than the head, the punctures being .025mm in diameter; the posterior border is broadly angulate, the angle rounded, the outer margin more or less rounded, and the whole prothorax broadest posteriorly. The elytra are very ample, equal, each independently, very broadly and regularly rounded at the apex, which does not reach the tip of the abdomen; they are very distinctly but narrowly punctato striate, in nine straight, equidistant complete rows, besides an auxiliary row next the outer margin, for a portion of the distance; near the tip of the wing, the outer and inner rows curve toward the middle of the apex, and all fade out before reaching it; the entire border of the elytra is marginate. The femora, especially the hind pair, are stout; the hind tibiae are considerably shorter than the femora, and there are apparently, on one side, faint indications of the two long tibial spurs, with which the apex of the hind tibiae are armed in this genus. The abdomen is exceedingly short and broad, the apical segment protruding a little beyond the others and well rounded.

Length, 5.25mm; breadth of prothorax, 2mm; of body at middle of elytra, 3.25mm; length of antennae, 2.2mm; of elytra, 3.75mm; breadth of same, 1.35mm; length of middle femora, 1.05mm; breadth of same, .28mm; length of hind femora, 1.56mm; breadth of same, .48mm; length of hind tibiae, 1.02mm; distance apart of elytral striae, .265mm.

18. *Bruchus anilis*.—A single specimen was brought by Professor Denton from Chagrin Valley, White River. It consists of two elytra, in natural juxtaposition seen from above. They have a brown color, which is wanting in certain places, but in so irregular a manner that it is doubtless fortuitous; they are furnished with striae, but these, as well as all color, are entirely obliterated in the middle of the wing; this again is doubtless a defect of preservation, since the sutural edges of the elytra are similarly affected; the striae are deep, sharply cut, straight, subequidistant, eight in number, fading out at the apex of the elytra, the space between them smooth and arched.

Length of one elytron, 5mm; breadth of same, 1.9mm; distance of striae apart, .45mm.

#### ORYCTOSCIRTETES nov. gen.

This genus belongs to the group of *Chrysomelidae*, of which *Haltica* Ill. is the best known representative, the members of which are peculiar

for their swollen hind thighs, enabling them to spring to great distances. It appears to belong to the group of *Oedionychites* Chap., in which the last tarsal joint has a more or less prominent bulbous expansion on the hind legs; but it differs from any of the genera described by Chapuis in the nature of this expansion, as well as in other tarsal peculiarities. The basal joint of these hind tarsi is moderately long and cylindrical, scarcely larger at the apical than at the distal extremity; the second and third joints are subequal, the latter slightly the larger, together as long as the basal joint, moderately lobate, the lobes pointed; while the apical joint is nearly as long as all the other joints combined, enlarges gradually from base to apex, so as to be fully two or three times as large at the apical as at the distal extremity, and bears a pair of exceedingly long and slender, apparently simple, very slightly curved claws, nearly half as long as the apical joint itself. In other respects it closely resembles the genus *Oedionychis* Latr.

19. *Oryctoscirtetes protogeum*.—A single specimen, pretty well preserved, and exhibiting the dorsal surface, was obtained by the United States Geological Survey of the Territories near Castello's ranch, South Park, Colorado. The head is pretty large, nearly as broad as the prothorax, the eyes moderately large, apparently circular, with large facets, their average diameter being nearly .02mm. The prothorax is broad, with well rounded, somewhat convex sides and front lateral angles, the anterior margin considerably concave; the posterior lateral angles are rectangular, and there is apparently a median furrow on the posterior half, although the appearance may be due to the crushing of the fossil. The surface of the prothorax, and also of the elytra, is very delicately granulate; the elytra are also furnished very indistinctly with several (five or six?) longitudinal ridges, straight and equidistant. The fore femora are swollen as well as the hind pair, but the middle femora cannot be seen. Both middle and hind tarsi are fully four-fifths as long as their tibiae.

Length, 5mm; breadth, 2.25mm; width of head, 1.25mm; of prothorax, 1.8mm; length of same, .92mm; of elytra, 3mm; of middle tibiae, 1.34mm; of middle tarsi, 1.12mm; of middle claws, .18mm; of hind femora, 1.32mm; breadth of same, .48mm; length of hind tibiae, 1.4mm; width of same, .18mm; length of hind tarsi, 1.14mm; of first joint, .32mm; of fourth joint (excl. claws), .48mm; of claws, .22mm; breadth of fourth joint at tip, .1mm.

20. *Trypodendron impressus*.—This species is represented by a single specimen, showing the prothorax and elytra, and was obtained from the Green River Beds in Western Wyoming by Mr. Richardson. It is slightly larger than *T. retusus* (Le C.), but has the prothorax punctured as distinctly as the elytra, and the punctures on the elytra show but a slight tendency to a longitudinal arrangement. The punctures of the prothorax are longitudinally obovate, a very little more frequent than on the elytra, equally distributed throughout; on the elytra they are also equally distributed, but circular, about 0.04mm in diameter, and average .1mm in distance apart; they have but an obscure longitudinal arrangement into nineteen or twenty rows; and the successive punctures of each row are at about the same average distance apart as those of two contiguous rows.

Length of prothorax, 1.28mm; height of same, 1.44mm; length of elytra, 2.8mm; breadth of same, 1.24mm.

21. *Sitones grandaeus*.—A single specimen, very poorly preserved, was found by Mr. Richardson on Green River, at the crossing of the Union Pacific Railroad. Little can be seen beside a vague outline of the form of the body, with a broken rostrum; the eye is large, obovate, longitudinally disposed, 0.42mm long, and 0.25mm broad; the elytra are fur-

nished with a number of slight, slender, raised ridges,  $0.31^{\text{mm}}$  apart, which are probably the reverses of striae. In general form, the insect appears to have closely resembled *Eudiagogus examinis* Scudd., but differs from it conspicuously by its longitudinal eye. Dr. Le Conte has suggested to me that it may be an *Anthrhibide*, near *Cratoparis*.

22. *Otiorynchus perditus*.—A single specimen, showing a side aspect, was obtained by Mr. Richardson at the same locality as the last. It differs from the species of *Otiorynchus*, with which I have compared it, in not having the prothorax conspicuously smaller than the body behind it. The head is withdrawn into the prothorax, almost to the hinder edge of the eyes; the snout is short, stout, slightly curved, bluntly rounded and rather tapering than enlarged at the tip, not quite so long (measuring from the front edge of the eyes) as the length of the pronotum; the eyes are rounded, subtriangular, with a diameter equal to half the width of the snout, the central facets with a diameter of  $0.027^{\text{mm}}$ ; the antennal scrobes are twice as long as broad, commencing at the middle of the snout and extending two-thirds the distance thence to its tip. The prothorax is equal, nearly as long as high, not tumid, rugulose. The elytra, which are not elevated at base above the prothorax, are simple, not very tumid, provided with about eight longitudinal slender rows,  $.3^{\text{mm}}$  apart, of low, raised, rounded points, nearly as distant from one another as those of contiguous rows; midway between each of these rows is a very inconspicuous dull ridge. Fragments of the legs remain, which agree, as far as they can be made out, with the same parts in *Otiorynchus*. In the general sculpturing of the elytra this insect is not very unlike *O. sulcatus* (Fabr.)

Length,  $8^{\text{mm}}$ ; of snout, beyond front of eyes,  $1.23^{\text{mm}}$ ; width of same,  $.75^{\text{mm}}$ ; length of antennal scrobes,  $.32^{\text{mm}}$ ; diameter of eyes,  $.46^{\text{mm}}$ ; length of pronotum,  $1.8^{\text{mm}}$ ; height of same,  $2.23^{\text{mm}}$ ; length of elytra,  $5.2^{\text{mm}}$ ; width of same,  $2.05^{\text{mm}}$ ; length of fore femora,  $1.8^{\text{mm}}$ .

23. *Entimus primordialis*.—A single specimen, found by Professor Denton, at Chagrin Valley, White River, represents this species. Besides a crushed elytron there are only some indeterminate fragments of the neighboring parts of the body. The form and sculpturing of the elytron resemble those of the Brazilian diamond-beetle so closely that I place the species provisionally in the same genus, or until further remains are obtained. The insect must have been rather small for an *Entimus*, although it is the largest of American Tertiary *Curculionida* known to me. It is of about the usual size of the species of *Otiorynchus*, and it is not at all improbable that it should be referred to the latter genus, some species of which have elytra with similar sculpturing and approximately the same form. The elytron is traversed by ten similar stout and coarse, longitudinal costae, most of which are broken up by transverse depressions into bead-like hemispherical prominences; at the tip of the elytron, however, and on the apical half of the inner two costae, this irregularity is nearly or quite lost sight of; the edges of the elytron, for about the width of one of the costae, is also smooth and depressed; the front border is sinuous, and the sutural margin appears the same on the stone, from the compression the elytron has undergone, which was sufficient to split it down the middle through half its length. Length of fragment,  $8^{\text{mm}}$ ; greatest breadth of unsplit portion,  $4^{\text{mm}}$ .

24. *Eudiagogus saxatilis*.—Four specimens were obtained by Mr. Richardson beyond the Green River on the Union Pacific Railroad, Wyoming. One of these represents a nearly complete side view of the insect without other appendages than the elytra; another presents a similar appearance, but even the elytra are gone, and the hinder edges of the posterior coxae are impressed upon the superior surface, giving the appear-

ance of short elytra; a third and fourth specimen are still more fragmentary. The snout is shaped much as in *Otiorynchus perditus* Scudd., being short, stout, and, especially anteriorly, arched, the front border being faintly angulate about the middle; the antennal scrobes cannot be certainly defined; the eyes are pretty large, transversely ovate, and are, in most of the specimens, indicated on the stone by an annulus of dark color, containing an interior narrow ovate pale spot,  $.22^{\text{mm}}$  long by  $.12^{\text{mm}}$  wide; while the eye itself is  $.4^{\text{mm}}$  in its longer and  $.3^{\text{mm}}$  in its shorter diameter; the facets of the interior portion are very minute, being scarcely  $.01^{\text{mm}}$  in diameter. The prothorax is somewhat tumid, rather higher than long, very profusely and delicately punctulate, the anterior and posterior walls between the pittings often less elevated than the lateral walls, so that the punctures often form broken longitudinal furrows; the punctures are nearly uniform in size over the whole prothorax and average about  $.04^{\text{mm}}$  in diameter. The elytra are simple, not tumid, sloping off gradually toward the tip, not elevated at base above the thorax, and provided with six equidistant, very slender and slight, raised ridges, faintly broken into dashes by a series of minute, moderately distant punctures along the inner border of each; these punctures are of the same size as those on the prothorax; the ridges are about  $.16^{\text{mm}}$  apart. The posterior coxae have an incrassate posterior margin.

Length of body,  $4^{\text{mm}}$ ; of rostrum beyond the eye,  $.68^{\text{mm}}$ ; width of same,  $.46^{\text{mm}}$ ; length of prothorax,  $1.2^{\text{mm}}$ ; height of same,  $1.3^{\text{mm}}$ ; length of tegmina,  $2.8^{\text{mm}}$ ; width of same,  $.9^{\text{mm}}$ .

25. *Eudiagogus examinis*.—A considerable number of specimens of this insect were obtained by Mr. Richardson with the preceding species. All were fragmentary, and most of them rather obscure; they consist mostly of side aspects of the creature, but several are single elytra. The head is rather large at base, tapering, with a short, broad snout, not so deep as broad, equal and at the tip broadly rounded, directed downward and forward, slightly bent along the front margin; the antennal scrobes extend from the front edge of the eye nearly to the end of the rostrum, and are broadest next the eye, where they are half as broad as the eye itself, tapering regularly throughout and shallow; the eyes are moderately large, broadly oval, transverse or a little oblique, the upper extremity thrown backward and the lower forward. The prothorax is short, only about half as long as deep, not tumid, rather cylindrical, its surface smooth. The elytra are not broader nor higher at their base than the surface of the pronotum, and they are simple and furnished with seven equidistant, equally and not deeply impressed, longitudinal striae,  $.16^{\text{mm}}$  apart from one another, and the outer ones from the adjacent border; these striae are provided with slightly longitudinal punctures at regular intervals of about  $.1^{\text{mm}}$ , by which the striae are carried to about double their usual depth. Some of the specimens have lost the elytra, and on these the posterior edge of the hind coxae have been impressed through the abdomen, giving the insects the appearance of being furnished with elytra which cover but half of the abdomen. The same thing was noticed in other species.

Length of body, exclusive of rostrum,  $5.75^{\text{mm}}$ ; of rostrum beyond the eye,  $.62^{\text{mm}}$ ; breadth of same,  $.5^{\text{mm}}$ ; depth of same,  $.44^{\text{mm}}$ ; length of eye,  $.36^{\text{mm}}$ ; width of same,  $.24^{\text{mm}}$ ; length of prothorax,  $.72^{\text{mm}}$ ; height of same,  $1.3^{\text{mm}}$ ; length of elytra,  $3.05^{\text{mm}}$ ; width of same,  $1.2^{\text{mm}}$ ; length of fore femora,  $.72^{\text{mm}}$ ; width of same,  $.32^{\text{mm}}$ ; length of middle femora,  $.8^{\text{mm}}$ ; width of same,  $.32^{\text{mm}}$ ; length of hind femora,  $1.1^{\text{mm}}$ ; width of same,  $.34^{\text{mm}}$ .

26. *Eudiagogus effossus*.—This species is represented by a number of fragments brought by Mr. Richardson from the same place as the pre-



ceding species. They are mostly composed of fragments of elytra, and the only specimens which are preserved entire are such as give a dorsal or ventral aspect. These, however, are enough to show that they belong to a species closely allied to but distinct from the preceding, from which it differs principally in its smaller size, its slenderer and more tapering rostrum, the smaller circular eyes, and in the slightly more distant and rather more deeply impressed striae of the elytra. The following measurements will give a better understanding of the degree of difference between them in certain points.

Length of body, exclusive of rostrum,  $5^{\text{mm}}$ ; breadth of same,  $2.1^{\text{mm}}$ ; width of rostrum at base,  $.48^{\text{mm}}$ ; diameter of eyes,  $.28^{\text{mm}}$ ; distance apart of the elytral striae,  $.18\text{--}.20^{\text{mm}}$ ; distance apart of punctures in the striae,  $.11^{\text{mm}}$ .

27. *Hyllobius propectus*.—A single specimen was found by Mr. Richardson with the preceding species. It is very poorly preserved, being not only fragmentary but faintly impressed; the rostrum is broken, so that its length cannot be determined, but the general facies of the insect resembles that of *H. picivorus* Germ. so closely that it must be referred to the same genus. The rostrum is rather stout; the antennal scrobes are slender, and commence not far beyond the eyes; the eyes are very large, transverse obovate, with an interior clear space, as described in *Eudiagogus saxatilis* Scudd., with very small facets, scarcely  $.02^{\text{mm}}$  in diameter. The thorax is rather small, but apparently partially concealed by the way the specimen is crushed, not very tumid, and entirely smooth. The elytra are of much the same form as those of the species of *Eudiagogus* just described, provided with slender, shallow, impressed lines, about  $.22^{\text{mm}}$  apart; the latter are rather delicately punctured, the punctures a little less distant from one another than are the rows; the number of rows cannot be determined from this specimen.

Length, exclusive of rostrum,  $5^{\text{mm}}$ ; length of broken rostrum,  $.45^{\text{mm}}$ ; of eyes,  $.9^{\text{mm}}$ ; breadth of same,  $.44^{\text{mm}}$ ; length of elytra,  $4^{\text{mm}}$ .

28. *Anthonomus defossus*.—A single well-preserved specimen, presenting a side aspect, was obtained by Mr. T. L. Mead near Castello's ranch, South Park, Colorado. It is nearly as large as *A. hematopus* Boh., with a slightly more curved rostrum, slightly transverse eyes, and with more abundant pitting of the prothorax, which is also less obscured by hairs. The head is smooth, covered very sparsely with very fine, short, almost invisible hairs, directed downward; the antennal scrobes appear to be rather shallow. The prothorax is covered with exactly similar hairs, very distant, apparently arising only on the sharp ridges between the pits with which the surface is completely studded; these pits are rather deep, rounded, about  $.032^{\text{mm}}$  in diameter, and as closely crowded as possible; the thoracic pleura are similarly pitted, but with a little less frequency, and therefore with coarser bounding walls. The elytra are coarsely ridged with nine equidistant, stout, rounded costae,  $.1^{\text{mm}}$  apart, the fourth from the outer border terminating between the conjoined apices of those on either side of it; they are rather more prominent and more distant than in *A. hematopus*; the whole surface of the elytra, both costae and furrows, is dull rugulose. The legs are similar to those of the living species mentioned, but are somewhat shorter.

Length from front of head to tip of elytra,  $2.2^{\text{mm}}$ ; length of rostrum,  $.88^{\text{mm}}$ ; width of same,  $.11^{\text{mm}}$ ; length of prothorax,  $.54^{\text{mm}}$ ; of middle femora,  $.72^{\text{mm}}$ ; breadth of middle femora,  $.17^{\text{mm}}$ ; length of eye,  $.18^{\text{mm}}$ ; breadth of same,  $.14^{\text{mm}}$ .

29. *Cryptorhynchus annosus*.—A single specimen was found by Mr. Richardson beyond the Green River crossing of the Union Pacific Railroad. The fragmentary specimen is exposed on a side view, with head,

front of prothorax, and all the legs gone, and the elytra a little broken. The prothorax is profusely and uniformly pitted with moderately shallow pits, averaging  $.06^{\text{mm}}$  in diameter; the elytra are traversed by longitudinal costae, five of which are much more prominent than the others, with sharp, unbroken edges and equidistant from one another, the outer ones in close proximity to the sutural and outer edges; the other costae are obscure, slightly elevated, rounded, broken to a greater or less extent into raised points; midway between the first and second prominent costae (counting from the outer margin) there is an exactly similar prominent costa on the basal third of the elytron; the prominent costae are  $.2^{\text{mm}}$  apart.

Length of the prothorax,  $.88^{\text{mm}}$ ; height of same,  $1.64^{\text{mm}}$ ; length of elytron,  $1.96^{\text{mm}}$ ; breadth of same,  $1.08^{\text{mm}}$ .

30. *Eurhinus occultus*.—Three specimens of this species were found by Mr. Mead, near Castello's ranch, South Park, Colorado. It seems to belong to the *Baridiides* of Lacordaire, and in general appearance more resembles the species of the genus *Eurhinus* than those of any other group known to me; it is, however, smaller than they, and it may have greater affinities with the *Ceutorhynchides*. In any case it seems to be a strictly American type. The first specimen exhibits only the upper surface of the body with a portion of the rostrum. Nothing can be seen of the head excepting the base of the snout, which is slender (perhaps slenderer than usual for *Eurhinus*), with two longitudinal furrows upon the upper surface occupying, together, nearly the whole width of the rostrum. The prothorax is tumid, with sides subparallel close to the posterior extremity, but immediately beyond narrowing rapidly, but with convex outline toward the head; the surface is uniformly and very profusely punctate (granulose on the stone, which is a cast), the punctures averaging  $.04^{\text{mm}}$  in diameter. The elytra are in place, together not much broader than the prothorax, parted in the apical third, each independently rounded, produced to a blunt tip, and provided with six equidistant, slightly raised slender ridges (as now seen on the stone),  $.36^{\text{mm}}$  apart, interrupted slightly at regular and short intervals (so that the original doubtless had series of longitudinal stabs).

Length of body, exclusive of rostrum,  $6^{\text{mm}}$ ; of the visible part of the rostrum,  $.75^{\text{mm}}$ ; breadth of same,  $.36^{\text{mm}}$ ; length of prothorax,  $1.4^{\text{mm}}$ ; greatest width of same,  $3.15^{\text{mm}}$ ; length of elytra,  $4.3^{\text{mm}}$ ; width of same,  $1.75^{\text{mm}}$ .

A second specimen is very similarly preserved, and shows the same characteristics. In addition, however, the eyes and some of the legs may be seen. The former are very small,  $.16^{\text{mm}}$  in diameter, and circular; the legs are rather stout, the femora tumid; the width of the head at the eyes is  $.8^{\text{mm}}$ .

A third specimen is much more poorly preserved; it is similar to the first, but in relief; more of the rostrum can be seen, and one of the hind femora, which is very stout, being  $1.36^{\text{mm}}$  long and  $.68^{\text{mm}}$  broad.

31. *Brachytarsus pristinus*.—A single specimen was obtained by Mr. Richardson, with the other specimens found by him in Western Wyoming. It is very poorly preserved, and fragmentary. The head is roundish, with small circular eyes  $.08^{\text{mm}}$  in diameter. The prothorax is subquadrate, considerably larger than the head, and nearly as broad as the body at the base of the elytra; the latter are broken.

Length of fragment,  $2.1^{\text{mm}}$ ; breadth of same,  $.84^{\text{mm}}$ ; length of head,  $.39^{\text{mm}}$ ; breadth of same,  $.4^{\text{mm}}$ ; of thorax,  $.64^{\text{mm}}$ .